

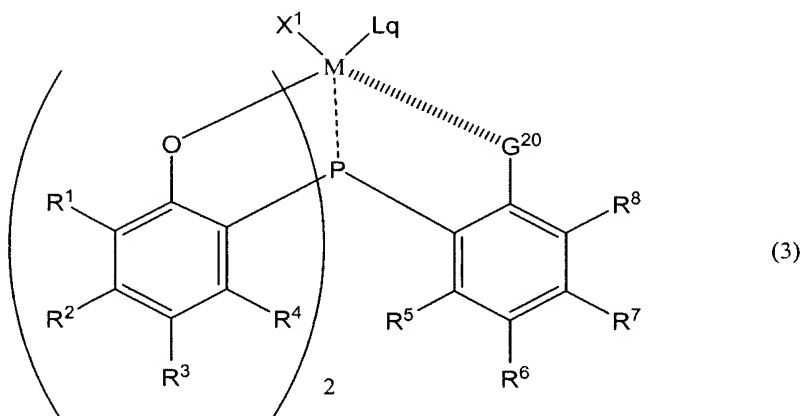
**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. – 39. (Cancelled)

40. (Currently Amended) A production method of a transition metal complex of formula (3):

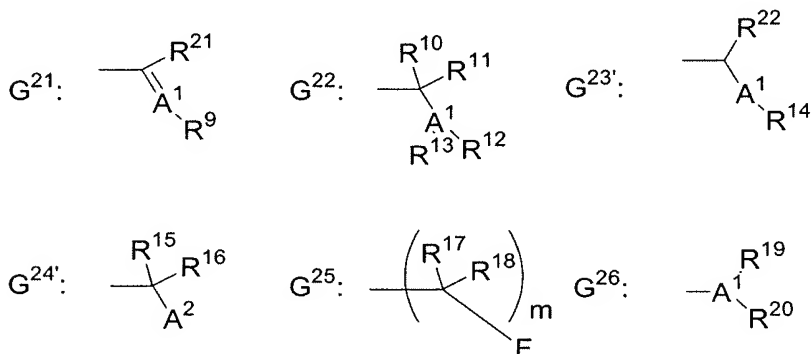


wherein M represents an element of Group 4 of the periodic table,

$R^1$ ,  $R^2$ ,  $R^3$ ,  $R^4$ ,  $R^5$ ,  $R^6$ ,  $R^7$ ,  $R^8$ ,  $X^1$  and L are as defined below,

q represents an integer of 0 or 1,

$G^{20}$  represents any one of  $G^{21}$  to  $G^{26}$ ,



wherein  $A^1$  represents an element of Group 15 of the periodic table,

provided that  $A^1$  in  $G^{23'}$  represents an anion of an element of Group 15 of the periodic table and  $A^1$  in  $G^{21}$  represents a nitrogen atom,

$A^2$  represents an element of Group 16 of the periodic table,

$R^9$  and  $R^{14}$  each represents,

a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),  
a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms,  
a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, or

**a group of formula:**

$R^{90}-N-R^{91}$ ;

wherein  $R^{90}$  and  $R^{91}$  are the same or different, and represent

a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),  
a substituted or unsubstituted aralkyl group having 7 to ~~20~~ 40 carbon atoms,  
a substituted or unsubstituted aryl group having 6 to ~~20~~ 40 carbon atoms, or  
a ~~ring~~ **cyclic** structure by being linked together;

$R^{12}$ ,  $R^{13}$ ,  $R^{19}$  and  $R^{20}$  each independently represents

a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),  
a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms,  
a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, or

$R^{12}$  and  $R^{13}$ , and  $R^{19}$  and  $R^{20}$ , **each independently, are linked together and**

**represent cyclic structure** ~~each independently represents a ring structure by being linked together;~~

$R^{10}$ ,  $R^{11}$ ,  $R^{15}$ , ~~and~~  $R^{16}$ ,  $R^{21}$  and  $R^{22}$  each independently represents

a hydrogen atom,

a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),  
a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, or  
a substituted or unsubstituted aryl group having 6 to 20 carbon atoms;

$R^{17}$  and  $R^{18}$  are **the same or** different ~~one another~~, and represent

a hydrogen atom,

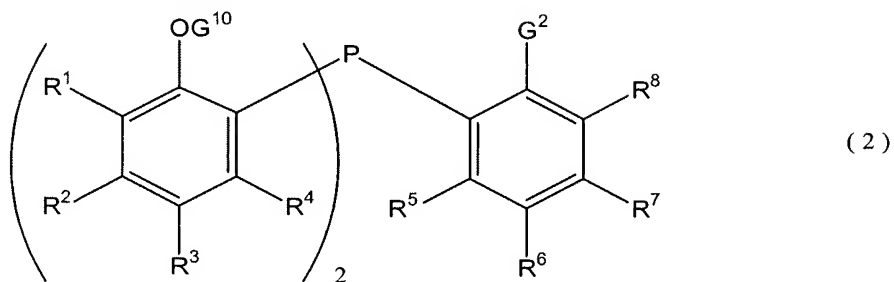
a halogen atom,

a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),  
a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, or  
a substituted or unsubstituted aryl group having 6 to 20 carbon atoms,

m represents an integer of 0 or 1, and

the line linking M and  $G^{20}$  represents that M is linked or coordinated to an element of Group 15 or 16 of the periodic table or to a fluorine atom constituting  $G^{20}$ ,  
which comprises reacting

a phosphine compound of formula (2):



wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>6</sup>, R<sup>7</sup> and R<sup>8</sup> are the same or different, and independently represent,

a hydrogen atom,

a halogen atom,

a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),

a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms,

a substituted or unsubstituted aryl group having 6 to 20 carbon atoms,

a silyl group substituted with a substituted or unsubstituted hydrocarbon having 1 to 20 carbon atom(s),

a substituted or unsubstituted alkoxy group having 1 to 10 carbon atom(s),

a substituted or unsubstituted aralkyloxy group having 7 to 20 carbon atoms,

a substituted or unsubstituted aryloxy group having 6 to 20 carbon atoms, or

an amino group disubstituted with hydrocarbons having 1 to 20 carbon atom(s);

R<sup>5</sup> represents,

a hydrogen atom,

a fluorine atom,

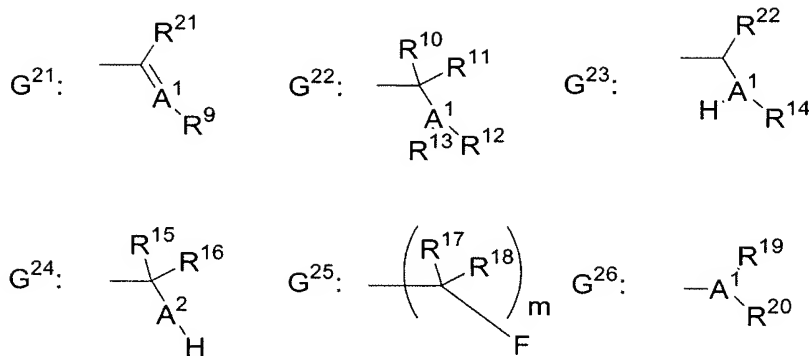
a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),

a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms,

a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, or

a silyl group substituted with a substituted or unsubstituted hydrocarbon having 1 to 20 carbon atoms,

G<sup>2</sup> represents any one of G<sup>21</sup> to G<sup>26</sup> below,



wherein A<sup>1</sup> represents an element of Group 15 of the periodic table, and A<sup>2</sup> represents an element of Group 16 of the periodic table, and A<sup>1</sup> in G<sup>21</sup> represents a nitrogen atom;

R<sup>9</sup> and R<sup>14</sup> each represents  
a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),  
a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms,  
a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, or  
a group of formula:

R<sup>90</sup>-N-R<sup>91</sup>

wherein R<sup>90</sup> and R<sup>91</sup> are the same or different, and represent  
a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),  
a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms,  
a substituted or unsubstituted aryl group having 6 to 20 carbon atoms, or  
a cyclic structure by being linked together,

R<sup>12</sup>, R<sup>13</sup>, R<sup>19</sup> and R<sup>20</sup> each independently represents,  
a substituted or unsubstituted alkyl group 1 to 10,  
a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, or  
a substituted or unsubstituted aryl group having 6 to 20 carbon atoms; or  
R<sup>12</sup> and R<sup>13</sup>, and R<sup>19</sup> and R<sup>20</sup>, each independently, are linked together and represent cyclic structure,

R<sup>10</sup>, R<sup>11</sup>, R<sup>15</sup>, R<sup>16</sup>, R<sup>21</sup> and R<sup>22</sup> each independently represents  
a hydrogen atom,

a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),  
a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, or  
a substituted or unsubstituted aryl group having 6 to 20 carbon atoms;

**R<sup>17</sup> and R<sup>18</sup> are the same or different, and represent**

**a hydrogen atom,**

**a halogen atom,**

**a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),**

**a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms, or**

**a substituted or unsubstituted aryl group having 6 to 20 carbon atoms,**

**m represents an integer of 0 or 1,**

wherein ~~R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup> and G<sup>2</sup>~~ are as defined in Claim 1, and G<sup>10</sup> represents a protective group of the hydroxyl group selected from alkyl groups having secondary or tertiary carbon atom linked to ~~an~~ **the** oxygen atom of phenol, or a C1 to C2 alkyl groups substituted with a substituted or unsubstituted alkoxy group, with a transition metal compound of formula (4):



wherein M represents an element of Group 4 of the periodic table,

X<sup>1</sup> represents,

a substituted or unsubstituted alkyl group having 1 to 10 carbon atom(s),

a substituted or unsubstituted aralkyl group having 7 to 20 carbon atoms,

a substituted or unsubstituted aryl group having 6 to 20 carbon atoms,

a substituted or unsubstituted alkoxy group having 1 to 10 carbon atom(s),

a substituted or unsubstituted araloxo group having 7 to 10 carbon atoms,

a substituted or unsubstituted aryloxy group having 6 to 10 carbon atoms, or

an amino group disubstituted with hydrocarbons having 1 to 20 carbon atoms; and

L represents a balancing counter ion or neutral ligand, being an atom or group similar to X<sup>1</sup>, and is bonding or coordinating to metal M,

L<sup>1</sup> represents a neutral ligand, and p represents an integer of 0 to 2.

41. (Original) The method according to Claim 40, a base is used.

42. (Original) The method according to Claim 41, wherein  $G^{10}$  is a hydrogen atom.

43. (Currently Amended) A production method of the transition metal compound of formula (3) according to Claim 40, wherein  $G^{10}$  is a protective group of the hydroxyl group selected from alkyl groups having secondary or tertiary carbon atom linked to ~~an~~ the oxygen atom of phenol, or a C1 to C2 alkyl group substituted with a substituted or unsubstituted alkoxy group.

44. (Original) The production method according to Claim 43, wherein  $G^{10}$  is a methoxymethyl group, an ethoxyethyl group, a methoxyethoxymethyl group, trimethylsilylethoxymethyl group or 1-ethoxyethyl group.

45. (Previously Presented) The production method according to Claim 40, wherein M is a titanium atom or a zirconium atom.

46. (Original) The production method of the transition metal complex according to Claim 45, wherein  $A^1$  represents a nitrogen atom and  $A^2$  represented an oxygen atom.

47. (Original) The production method of the transition metal complex according to Claim 46, wherein  $G^2$  is  $G^{21}$ .

48. (Original) The production method of the transition metal complex according to Claim 46, wherein  $G^2$  is  $G^{22}$ .

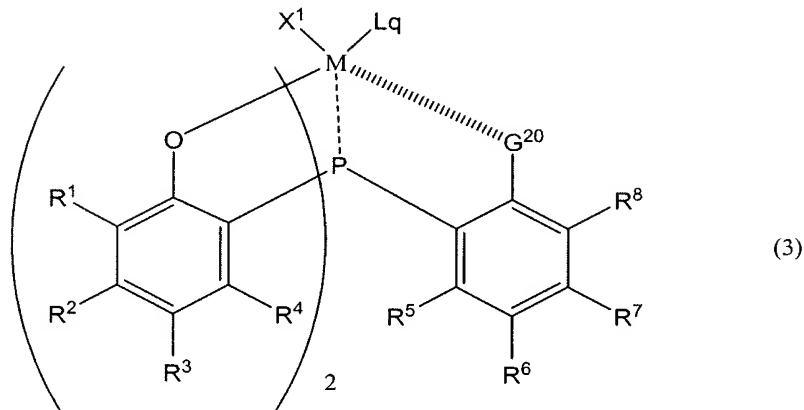
49. (Original) The production method of the transition metal complex according to Claim 46, wherein  $G^2$  is  $G^{23}$ .

50. (Original) The production method of the transition metal complex according to Claim 46, wherein  $G^2$  is  $G^{24}$ .

51. (Original) The production method of the transition metal complex according to Claim 46, wherein  $G^2$  is  $G^{25}$ .

52. (Original) The production method of the transition metal complex according to Claim 46, wherein  $G^2$  is  $G^{26}$ .

53. (Original) The transition metal complex of formula (3):



wherein M, L, X<sup>1</sup>, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, q and G<sup>20</sup> are as defined in Claim 40.

54. (Original) The transition metal complex according to Claim 53, wherein A<sup>1</sup> represent a nitrogen atom and A<sup>2</sup> represents an oxygen atom.

55. (Original) The transition metal complex according to Claim 54, wherein M is a titanium atom or a zirconium atom.

56. (Previously Presented) The transition metal complex according to Claim 54, wherein G<sup>2</sup> is G<sup>21</sup>.

57. (Previously Presented) The transition metal complex according to Claim 54, wherein G<sup>2</sup> is G<sup>22</sup>.

58. (Previously Presented) The transition metal complex according to Claim 54, wherein G<sup>2</sup> is G<sup>23</sup>.

59. (Previously Presented) The transition metal complex according to Claim 54, wherein G<sup>2</sup> is G<sup>24</sup>.

60. (Previously Presented) The transition metal complex according to Claim 54, wherein G<sup>2</sup> is G<sup>25</sup>.

61. (Previously Presented) The transition metal complex according to Claim 54, wherein G<sup>2</sup> is G<sup>26</sup>.

62. (Currently Amended) An olefin polymerization catalyst comprising a combination of transition metal complex according to Claim 53, compound A below, and optionally compound B:

compound A: any one of compounds A1 to A3, or a mixture of at least two of them,

compound A1: an organic aluminum compound of formula  $(E1)_aAl(Z)_{3-a}$ ,

compound A2: a cyclic aluminoxane having a structure of formula  $[-Al(E2)-O-]_b$ , and

compound A3: a linear aluminoxane of formula  $E3[-AlE3-O-]_cAlE3_2$ ,

wherein E1 to E3 are the same or different and each represents a hydrocarbon group having 1 to 8 carbon atom(s),

Z is the same or different, and represents a hydrogen atom or a halogen atom,

a represents 1, 2 or 3,

b represents an integer of 2 or more, and

c represents an integer of 1 or more;

compound B: any one of compounds B1 to B3, or a mixture of at least two of them,

compound B1: a boron compound of formula  $BQ^1Q^2Q^3$ ,

compound B2: a boron compound of formula  $Z^+(BQ^1Q^2Q^3Q^4)^-$ , and

compound B3: a boron compound of formula  $(L-H)^+(BQ^1Q^2Q^3Q^4)^-$ ,

wherein B is a boron atom of a trivalent state, and

$Q^1$  to  $Q^4$  are the same or different and represent a halogen atom, a hydrocarbon group having 1 to 20 carbon atom(s), a halogenated hydrocarbon group having 1 to 20 carbon atom(s), a silyl group substituted with the hydrocarbon groups having 1 to 20 carbon atom(s), or an amino group disubstituted with the hydrocarbon groups having 1 to 20 carbon atom(s), **and** " $Z^+$  represents an inorganic or organic cation, and (L-H) represents Brønsted acid".

63. (Original) A production method of an olefin polymer, which comprises polymerizing an olefin in the presence of the olefin polymerization catalyst according to Claim 62.